

## CLAIMS

What is claimed is:

1. A composition for material formation on self assembled peptide-amphiphiles comprising: a solution of at least one ionically charged species of peptide-amphiphile and at least one salt providing at least one ion from the material to be formed and having the same signed ionic charge as the peptide-amphiphile.
2. The composition of claim 1 wherein the peptide-amphiphile includes an amino acid selected from the group consisting of serine, phosphorylated serine, aspartic acid,  $\beta$ -amino acids, and  $\gamma$ -amino acids.
3. The composition of claim 1 wherein the pH of the solution is adjusted to substantially physiological pH.
4. A method of making materials on self assembled peptide-amphiphiles, the method comprising: preparing a first solution with at least one ionically charged species of peptide-amphiphile and at least one salt providing at least one ion from the material and having the same signed ionic charge as the peptide-amphiphile; preparing a second solution with an ion from the material and having opposite signed ionic charge to the peptide-amphiphile of said first solution; and mixing said first and second solutions to self-assemble said peptide amphiphiles into nanofibers and a nanofiber gel and to form said material substantially on said nanofiber surfaces.
5. The method claim 4 further comprising aging the mixture of said first and second solutions to control the size and rate of growth of material on the self-assembled peptide amphiphile nanofibers.
6. The method of claim 4 further comprising: adjusting the pH of one of the solutions prior to mixing them together.
7. The method claim 4 wherein said material is used in the treatment of a patient with said material further comprising: administering to a site in need on the patient an effective amount of at least one ionically charged species of peptide-amphiphile and

at least one salt providing at least one ion from the material to be formed and having the same signed ionic charge as the peptide-amphiphile.

8. The method of claim 7 further comprising administering to the site in need on the patient at least one salt having opposite signed charge to the peptide-amphiphile.
9. A composition comprising: a material nucleated and grown on the surface of nanofibers in a nanofiber gel; said material grown and oriented on the surfaces of said fibers substantially throughout the nanofiber gel.
10. The composition of claim 9 wherein said nanofibers are formed from self-assembled peptide amphiphiles.
11. The composition of claim 9 wherein said material is chosen from the group consisting of biominerals, magnetic materials, conductive materials, nerves, tissue, and cells.